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ROMA — STABILIMENTO TIPOGRAFICO F. FAILLI

The radio communiqués of the International Institute of Agriculture are transmitted between 11.50 and 12 (noon) on the following days: Monday, Italian; ***Tuesday,*** French; ***Wednesday,*** English; ***Thursday,*** German; ***Friday,*** Spanish.

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ACTIVITY OF THE INTERNATIONAL INSTITUTE OF AGRICULTURE

Permanent Committee of the International Institute of Agriculture. — The Permanent Committee of the International Institute of Agriculture met on June 1943 for its Summer Session. Baron G. ACERBO presided. The official Delegates of the following countries attended the meeting: Argentina, Burma, Bulgaria, Croatia, Denmark, Finland, France, Germany, Hungary, Japan, Iran, Ireland, Italy, Paraguay, Portugal, Romania, Spain, Sweden, Switzerland and Turkey.

The Committee, after listening to the reports of the President and of Secretary General regarding the recent administrative and technical activities of the Institute, discussed important questions of internal character and of economic and technical collaboration in the international field. Important decisions on these matters were taken. The Committee expressed its satisfaction at the way in which the Institute Bureaus have made their work ever more strictly adhere to the necessity of a program of a valid defence of the interests of world agricultural economy, in view of post war reconstruction.

Committee of the International Forestry Center (C.I.S.) — The Committee of the C. I. S. held its VIIth Session at Berlin from May 11 to May 14 1943. The following member States were represented at the meetings: Bulgaria, Croatia, France, Germany, Hungary, Italy, Romania, Slovakia, Spain, Sweden, Switzerland and Turkey. The International Institute of Agriculture was represented by its President, H. E. Baron G. ACERBO, its Vice-President M. COMOLLI, the Delegate of Germany M. WEBER, the delegate of Spain M. BILBAO, and the Secretary General Prof. U. PAPI. The Session was attended also by the representatives of the Union Internationale des Instituts de Recherches Forestières, of the «Liga Silva Mediterranea» and of the «Commission Internationale de l'Utilisation du Bois» of the C. I. S.

The meeting was opened by the President of the C. I. S., H. E Baron de WALDBOTT, Delegate of Hungary, whose words of greeting were followed by a speech of the official representative of the German Reich, Secretary of State, Generalforstmei-

ster ALPERS, Vice-President of the C. I. S., and by a very cordial address of the President of the International Institute of Agriculture Baron ACERBO. As usual, the first two meetings were consecrated to general and organisation questions. The Report of the General Director of the Center, Prof. Dr. KÖSTLER, dealt with the general activities of the Bureau since the last session and emphasised the essential points of collaboration of the C. I. S. with the authorities and interested elements of the menber-States and of the other international organisations.

The first part of the meetings was spent in the election of the President and Vice-President of the Committee to succeed M. de WALDBOTT (Hungary) and M. ALPERS (Germany) whose office turn was over. Mr. ALPERS, Delegate of Germany was unanimously elected President for a period of four years. M. AMINOFF, Delegate of Sweden, General Director at the Direction of Domains at Stockholm, was elected Vice-President. The second part of the meetings was dedicated to scientific problems which occasioned interesting exchanges of view between the delegates.

In the days consecrated to excursions, the delegates attending the Session visited some very interesting establishments of Germany. They were accompanied by experts who furnished all the necessary information on the work that was accomplished.

The VIIIth Session of the International Forestry Center will be held at Strbske Pleso (Slovakia) from August 31 to September 4 1943.

At that meeting, the Institute will present the provisional edition of the third and last part relative to America and Asia of the work « International Trade in Wood » (1925-1930). The first part, dealing with Europe and the U. S. S. R., was presented at the VIth Session of the C. I. S. at Vienna in September 1942 and the second part, dealing with Africa and Oceania, at the VIIth Session at Berlin in May 1943.

A detailed survey of the VIIIth Session of the International Forestry Center will be published shortly.

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INTERNATIONAL BULLETIN
OF PLANT PROTECTION

1943 Nos. 7 & 8

DISCOVERIES AND CURRENT EVENTS *

ITALY.

The Biology of the Weevil *Lixus junci* in Relation to the Cultivation of the Sugarbeet †

It is practically the general rule that the enormous development that some species of insects harmful to cultivated plants manage to attain, is in direct relation either to the extension in area under different crops, or to the absence, in zones of recent reclamation or those into which a specific cultivated plant has been introduced not long before, of the natural enemies of these insects.

In other words, man, by extending the one-crop system, prepares with his own hands the conditions favourable for augmenting the development of the parasites of the plant in question, which parasites, finding abundant nourishment and no natural enemies, may multiply to ever increasing numbers from year to year, in this way jeopardizing the crop or obliging man to declare war without quarter against them.

If such, however, be the usual rule, it should be taken into account that the cultivation system followed for some plants may, by constantly interrupting development at a specific vegetative phase, compel some parasites to modify their life cycle and to model it, so to speak, in a way differing from the natural form.

These modifications in the biology of the insect may, sometimes, be realized in a manner particularly favourable in the sense of a numerical exaltation of the species, so that it may breed more easily and more abundantly than was the case under natural conditions.

The cultivation of the sugarbeet offers precisely a very interesting and very typical case of the modifications in the life cycles of the plant and of one of its most formidable parasites, *Lixus junci* Boh. (*Coleoptera Curculionidae*).

As is known, the sugarbeet is a biennial Chenopodiaceous plant ; in the course of its first year it develops a fleshy, swollen, sugar-yielding tap-root, crowned by a rosette of leaves with strong petioles, breaking when turgid ; during the second year, a racemose inflorescence, greatly ramified, from a metre to a metre and a

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* Under this and the next heading the countries are arranged in French alphabetical order.

† Communication from Prof. GIAN MARIA GHIDINI, Institute of Zoology of the Rome University.

half in height, appears and develops very rapidly from the centre of the leaf rosette or cluster. The formation of this inflorescence and its fructification occur mainly at the expense of the reserves of the tap-root which, proportionately to gradual lignification diminishes in size and loses its turgidity.

As the treatment for the extraction of the sugar or for the manufacture of alcohol requires beets which have bolted, it follows that in the beet crop zone,

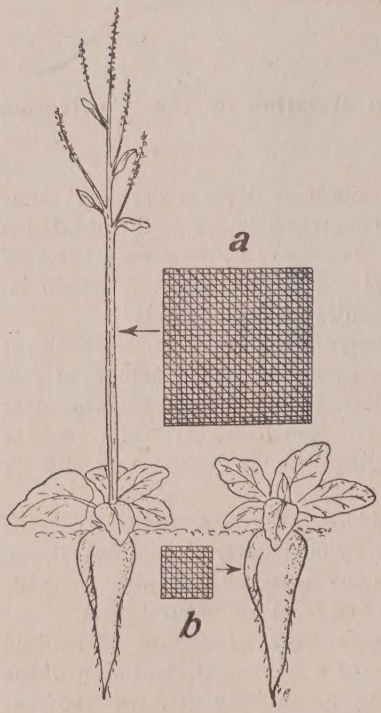

Fig. 1. — The hachured squares are proportional to the maximum number of larvae of *Lixus junci* in the flowering beets (*a*) and in the beets with basal leaf rosette only (*b*).

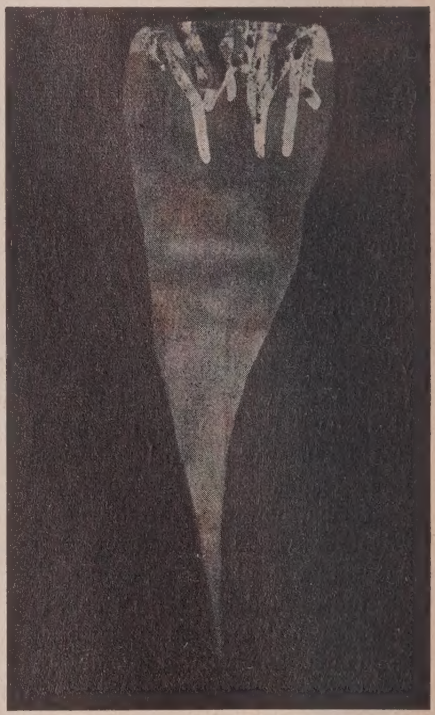

Fig. 2. — Tunnels made by larvae of *Lixus junci* in the tap-root of a sugarbeet with basal leaf rosette only.

all the beets are harvested before the formation of the inflorescence, namely, when they only show the basal cluster of leaves corresponding to a vegetative period of a little less than a month ; in these zones, therefore, beets with the inflorescence developed will be found but rarely.

Let us now consider the broad outlines of the biology of and the damage caused by *L. junci* to sugarbeet crops. The adults of *Lixus*, after having wintered in the ground, spread through the beet-fields during the second fortnight of April ; at

this period, the beets are more or less developed, according to whether sowing was early or late.

Unlike another weevil, *Temnorrhinus mendicus*, a voracious devourer of the leaves of the beet, *Lixus* feeds very little on these, consequently, aresenical treatments of the leaves gives little tangibility in the way of results; coupling rapidly becomes numerous and the female soon begins to lay. To this end, the insect with its rostrum bores a hole in the fleshy petiole of one of the outermost leaves of the rosette, subsequently inverts its position and after having introduced into the hole the extremity of its abdomen, deposits an egg therein; the insect then turns again and carefully pushes the egg to the bottom of the hole and closes the opening with plant debris pasted together with saliva.

The larva which hatches, after a few days begins to bore, descending the petiole, a tunnel which it maintains uniform in calibre by continually shifting from top to bottom and vice versa; this calibre however, is enlarged proportionately as the size of the larva increases.

If the egg is deposited near the axil of the leaf, the larva in descending soon reaches the tap-root and establishes itself there by boring a more or less vertical tunnel 7 to 8 cm. in length. If, on the contrary, the egg is deposited nearer the limb of the leaf, the larva remains for a longer period in the petiole of same, but, as the outside leaves of the rosette, which are the oldest and precisely those where oviposition is most abundant, tend to wither to be replaced by those which form from their axillary buds, here also the larva ends by passing into the tap-root boring a shorter tunnel, though not less large than that of the larva which had penetrated earlier on into the tap-root.

Fig. 3 — Ratio in percentage of larvae of *Lixus junci* parasitized by *Pimpla roborator*: (*a*) in flowering beets and (*b*) in beets with basal leaf rosette only.

In the case of severe infestation, 100 per cent, of the beets are parasitized and each beet may contain up to 20 larvae.

On maturity, the larva, while remaining in the same tunnel, changes into a pupa and subsequently into a perfect insect, which emerges into the open towards the end of June and throughout the month of July. It is at this time that the adult insect, if there are still leaves of the beet available, feeds abundantly.

In short: *L. junci* attack on beets with basal leaf rosette is of a nature to jeopardize seriously the integrity of the tap-root which represents the favourite seat of the larvae; here, they are but rarely parasitized, and a very high percentage of them attain the imago stage for which as yet no parasite is known.

Let us now consider what takes place when intermixed with plants not long sown, are transplanted beets which have bolted, that is, beets which have wintered. At the moment when the *Lixus* attack the beet-fields, they concentrate chiefly on the bolted plants and lay their eggs in the floral stems. The larvae which hatch tunnel in the stem and never reach the tap-root. Compared with those living in

the beets with basal leaf rosette only, therefore, they have a habitat which we will call aerial, and are protected against the outer environment by a thinner layer of plant substance.

Investigations carried out last year in the Agro Pontino showed that, in a zone slightly affected, the average number of larvae living in each plant with floral stem developed was 81.7 with a maximum of 174, truly very eloquent figures if compared with the maximum figure in the case of infestation of plants with basal leaf rosette only, namely, 20.

What deductions can be drawn from these observations? Firstly, bolted plants represent the natural seat of oviposition and larval development of *L. junci*, which explains the concentration of the adults of this species on these plants when intermixed with plants in an early stage of growth; in their absence, the *Lixus* has adapted itself, so to speak, to laying in beets without inflorescences; moreover, in the latter, the larvae of *Lixus* are obliged, for reasons of space, to pass into the tap-root and, in consequence to descend below the surface of the ground, while in the flowering beets, they remain throughout their life in the floral stem, that is, at a level about the surface of the soil.

This difference in habitat naturally has consequences on the biology of the insect: in the first case, the larvae escape from their most hardened enemies, in the second, on the contrary, large numbers are destroyed. The most active parasite we observed in the Agro Pontino is the ichneumonid fly *Pimpla roborator* F.

As is known, the females of this hymenopter possess a terebra with which they pierce the plants which harbour their victims; in these they deposit two eggs and the larvae which hatch therefrom feed on the prey. If the thicknes of the plant which separates the prey from its assailant is greater than the length of the terebra of the hymenopter, it is materially impossible for it to reach its prey and thus fulfil its function of control.

This is precisely what occurs in the particular case of the larvae of *L. junci* which live in the thick tap-root of the sugarbeet, while those which live in the floral stems are easily reached; if, moreover, account is taken of the fact that *P. roborator* is essentially a heliophilous species, it will be understood that its activity is greatly reduced when a luxuriant mass of foliage such as characterizes non-flowering beets, protects the zones where its action is needed.

We have now made clear the concept expounded above, namely, that the cultivation of the beetroot for industrial purposes, by constantly arresting the vegetative cycle of the plant before the inflorescence is produced, induces *L. junci* to lay under conditions which are not natural; this change has determined the passage of the larvae of the parasite to the interior of the tap-root, thus realizing a condition favourable for protecting these larvae from the most active of their natural enemies.

From what has been said, it appears evident that in the case of heavy infestation, the removal, in the tap-root, by the numerous larvae which have been able to install themselves there, of material industrially utilizable is immense and besides, account must also be taken of the damage caused through changes in the pulp brought about and promoted by the presence of the larvae. All this leads to heavy losses

on the part of the growers who have given much time and care to this crop, causes more or less serious controversies at the time of sampling and also involves an appreciable loss for the country.

It is necessary, therefore, to take steps against this parasite by every possible means. The question is how ?

First let us endeavour to attack the adult insects during the periods when they feed on the beet leaves. A good initial treatment with arsenical solutions is not to be disregarded, even if the growers do prove very satisfied for the simple reason that it is difficult to account for all the dead insects which fall to the ground and end by merging into it. Another treatment should be given a few days before lifting the beets in order to destroy the adults which have already emerged and which will remain over the winter.

As regards control of the larvae, it is evident that operations some score days beforehand would realize a mass destruction of these insects, because the larvae, on an average, would be destroyed at the factory and the effect of such a measure would surely be felt the following year ; but against this, however, is the fact that the expedient is not economical, as this period coincides with the vegetative stage of the plant in which the curve of accumulation of the sucrose in the tap-root marks its greatest angular coefficient. *

An endeavour, therefore, will be made to turn to account what has been learnt by the biological study of the parasite.

Firstly, nurseries should be established by sowing in September-October beets to remain over the winter. Each beet-grower will take from these nurseries a certain number of plants which, at the time of spring sowing, he will place around the fields, at approximately three metres inside the edge and spaced one or two metres apart.

These plants will serve as bait since, towards the end of April, they will have completely developed inflorescences on which, as has already been stated, a large number of *Lixus* will concentrate for oviposition.

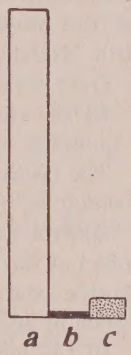

Fig. 4. — Degree of infestation by *L. junci* larvae in flowering plants (*a*) and in plants with basal rosette (*b*) cultivated in the same plot ; (*c*) probable degree of infestation of these same plants cultivated in the absence of bolting plants.

The preference enjoyed by these plants on the part of the insect as compared with the non-flowering beets is the basic factor for keeping the latter healthy.

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* See BOUILLENNE, R., KRONACHER, P., DE ROUBAIX, J. Note préliminaire sur les étapes du cycle végétatif de la betterave sucrière. *Académie Royale de Belgique. Bulletin de la Classe des Sciences*, Bruxelles, 1940, 5e série, tome XXVI, p. 240-260.

THE NETHERLANDS.

The Colorado Beetle (*Leptinotarsa decemlineata*) in 1942 *

The spread of the Colorado beetle in the Netherlands in 1942 was practically the same as in 1941.

The presence of this beetle was reported only in the part south of the Maas, but diffusion in the south-western part was more intense, because numerous insects were thrown onto the shores of the island of Walcheren and from there spread over the province of Zeeland and part of the provinces of North Brabant and South Holland.

Over 2000 Colorado beetles were collected on the shore.

In the eastern part of the province of North Brabant and in the province of Limburg, dispersion was very weak.

The beetle was observed in 98 communes (59 in 1941), in 365 (177) districts, of which 85 (51) may be considered as breeding centres.

Control was effected as in the previous years by means of trap plants about the foci of the preceding year, and by accurate observation for over two months; intensive control of potato fields and 3 sprayings with a 0.4 per cent. solution of calcium arsenate in the part of the country to the south of the Rhine.

In the localities where the Colorado beetle was reported, complete eradication measures were applied and, seeing that infestation in general was weak, it is very probable that the result of this treatment will have effect.

The insect appeared for the first time on May 21; the first oviposition was observed on June 6 and the first larvae on June 26. The first generation appeared on July 20 and 24 and the last adult insect on October 3. No second generation was observed.

In general, the situation may be considered as favourable.

Sprays were applied during the periods June 15-23, July 5-15 and July 22-August 1.

The quantity of calcium arsenate put at the disposal of the growers amounted to 548,141 kg. Spraying operations were checked by 140 inspectors. Expenses totalled approximately 350,000 florins.

LEGISLATIVE AND ADMINISTRATIVE MEASURES

Belgium. — The Ministry of Agriculture and Supplies has drawn up a List of fungicides containing copper provisionally or definitively authorized on February 25, 1943 and per cent. content in pure copper.

This list is published conformably with the provisions of Ordinance No. 1-43 of February 22, 1943 [see this *Bulletin* 1943, No. 4, pp. 58-60] regulating the distribution of copper fungicides.

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* Communication from the Phytopathological Service of the Netherlands, Wageningen, official correspondent of the International Institute of Agriculture.

The products marked with an asterisk serve both as fungicides and as insecticides.

To this list of fungicides, arranged in alphabetical order, which may be sold by wholesale merchants in fungicides, and by retailers, exclusively to holders of vouchers for pure copper, will be added, progressively, the fungicides authorized for sale and subsequently registered by the State Phytopharmacy Section at Gembloux, in conformity with the Decree dated October 15, 1941 [see this *Bulletin* 1941, No. 12, p. 225] regulating the sale of insecticides, fungicides, weedicides and other parasiticidal products. (*Moniteur belge*, Bruxelles, 21 avril 1943, nº 111, p. 2236-2240 ; *ibid.*, 30 avril 1943, nº 120, p. 2422).

* * * A Decree of May 8, 1943 authorized the capture of sparrows by means of the draw-net called 'tirasse', to the exclusion of any other, up to September 15 inclusive, throughout the country. (*Ibid.*, 21 mai 1943, nº 141, p. 2865).

Denmark. — A list has been published of the verified preparations for use against plant diseases and pests, in force for the year 1943. (*Tidsskrift for Planteavl*, København 1943, 47. Binds, 3. Haefte, Side [539]-552).

France. — By Ministerial Decree of December 31, 1942 the importation of plant products, under all custom regulations with the exception of international transit, gives rise to the levying of an inspection tax fixed at 2 francs for every 1,000 francs value of the products imported, with a minimum tax of 10 fr. This duty, however, is not levied when the said products have, by virtue of the Law dated March 25, 1941 [see this *Bulletin* 1941, No. 10, p. 188] regarding phytosanitary inspection, to be examined compulsorily by the Plant Protection Service.

The Ministerial Decree of April 29, 1935 [see this *Bulletin* 1935, No. 8, p. 181] is abrogated. (*Journal officiel de l'Etat français*, Vichy, 22 janvier 1943, LXXV[e] année, nº 19, p. 196).

* * * A Ministerial Decree dated April 7, 1943 establishes the constitution of the Advisory Board for plant protection, instituted by Ministerial Decree of May 31, 1942 [see this *Bulletin* 1942, No. 5, pp. 72-73]. (*Ibid.*, 14 mai 1943, nº 115, p. 1329).

Italy. — The Ministerial Circular No. 122 of January 22, 1943 intructs the Directors of the Phytopathological Observatories to inspect periodically the food stocks, in particular cereals and pulses, brought to the 'ammassi' (pooling centres) and to adopt, if need be, the necessary measures for their sanitary protection. (*Bollettino Ufficiale del Ministero dell'Agricoltura e delle Foreste*, Roma, 1-11 febbraio 1943, anno 1937, n. 4-5, p. 214).

* * * A Ministerial Decree dated May 11, 1943 renders compulsory, during the year 1943, the control of the olive fly [*Dacus oleae*] in the commune of Pisciotta, Province of Salerno *.

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* Communication from the Ministry of Agriculture and Forests, Rome to the International Institute of Agriculture.

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